

Atty Docket No. JCLA8676-R

Serial No. 10/055,580

REMARKS

This is a full and timely response to the outstanding non-final Office Action mailed Feb 25, 2004. Reconsideration and allowance of the application and presently pending claims are respectfully requested.

1. Present Status of the Application

Upon entry of the amendments in this response, claims 78-91 remain pending in the present application. More specifically, claims 78-80, 83-87, 90 and 91 are directly amended. These amendments are specifically described above. It is believed that the foregoing amendments add no new matter to the present application.

2. Response To Objections/Rejections**Response To Claim Rejections Under 35 U.S.C. Section 103**

As currently amended, independent claim 78 recites below:

78. A bonding structure positioned on a pad of a chip, wherein the bonding structure is suited to be bonded on a pad of a substrate, the substrate has a patterned solder mask, and the patterned solder mask layer has at least one opening that exposes the pad of the substrate, the bonding structure comprising:

a conductive pillar positioned over the pad of the chip; and

a solder cap positioned over the conductive pillar, wherein the solder cap has a transverse dimension smaller than that of the opening in the patterned solder mask, wherein *the solder cap is formed over the conductive pillar before the solder cap is bonded to the pad of the substrate.*

(emphasis added)

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Applicant respectfully asserts that the method claimed in claim 78 of the present invention patentably distinguishes over Kitajima's structure, Marrs' structure, Ho's structure and Somaki's structure.

The present invention in claim 78 discloses the relationship between the bonding structure positioned on a chip and an opening in a patterned solder mask on a substrate. The solder cap has a transverse dimension smaller than the transverse dimension of the opening in the patterned solder mask.

Kitajima, Ho and Somaki fail to teach, hint or suggest the relationship between the bonding structure positioned on a chip and an opening in a patterned solder mask on a substrate. Marrs teaches that mélallization 502 is formed on a bonding contact 501C of a substrate 501, not formed on a bond bump 312, before the bond bump 312 is bonded to the substrate 501, as shown in FIG. 6 and 7. However, the present invention discloses that a solder cap is formed over the conductive pillar before the solder cap is bonded to the pad of the substrate, claimed in claim 78. Therefore, Applicants consider that the subject matters claimed in claim 78 can not be attained by combining the citations by Kitajima, by Marrs, by Ho and by Somaki.

To establish prima facie obviousness of a claimed invention, all the claim limitation must be taught or suggested by the prior art. M.P.E.P. § 2143. The above limitations in claim 78 are not taught by by Kitajima, by Marrs, by Ho and by Somaki. As a result, withdrawal of these rejections is respectfully requested.

As currently amended, independent claim 85 recites below:

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85. A bonding structure positioned on a pad of a chip, comprising:
a conductive pillar positioned over the pad of the chip; and
a solder cap positioned over the conductive pillar, *the solder cap having a side wall, all of which is exposed*, wherein the solder cap has a transverse dimension smaller than the transverse dimension of the conductive pillar.

(emphasis added)

Applicant respectfully asserts that the method claimed in claim 85 of the present invention patentably distinguishes over Kitajima's structure, Marrs' structure, Ho's structure and Somaki's structure.

The present invention in claim 85 discloses that a bonding structure comprises a conductive pillar and a solder cap. The solder cap is formed over the conductive pillar. The solder cap has a side wall, all of which is exposed.

Marrs, Ho and Somaki fail to teach, hint or suggest that a bonding structure formed on a pad of a chip comprises a conductive pillar and a solder cap. Kitajima teaches that a solder bump element 46 is formed on a gold bump element 44, as shown in FIG. 11. The gold bump element 44 covers the side wall of the solder bump element 46. However, the present invention discloses that the solder cap has a side wall, all of which is exposed, claimed in claim 85. The above limitation is not disclosed in the citations by Kitajima, by Marrs, by Ho and by Somaki, so applicants consider that the subject matters claimed in claim 85 can not be attained by combining the these citations.

To establish prima facie obviousness of a claimed invention, all the claim limitation must be taught or suggested by the prior art. M.P.E.P. § 2143. The above limitations in claim 85 are

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not taught by by Kitajima, by Marrs, by Ho and by Somaki. As a result, withdrawal of these rejections is respectfully requested.

For at least the foregoing reasons, Applicant respectfully submits that independent claims 78 and 85 patently define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 79-84 and 86-91 patently define over the prior art as well.

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CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims 78-91 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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Respectfully submitted,


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